

Compact High-Resolution, Time-Resolved Intensified Image Sensor, Phase I

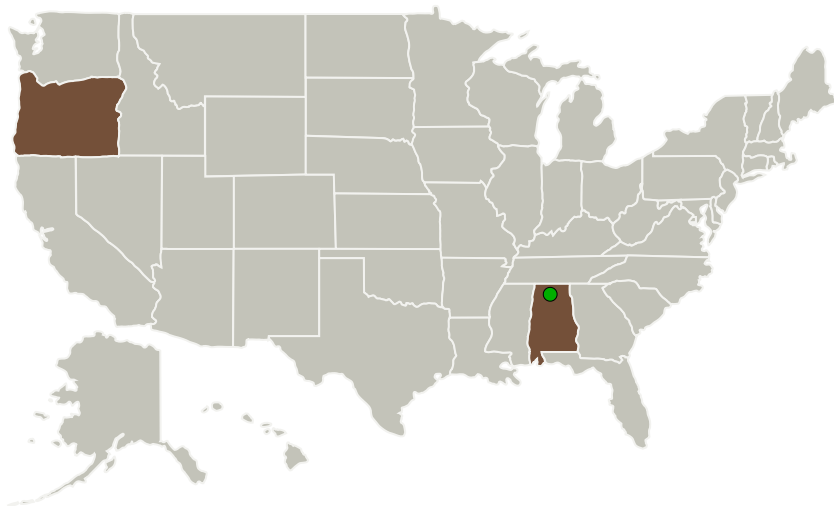
Completed Technology Project (2015 - 2015)



Project Introduction

In situ planetary instruments face challenges that greatly exceed even the challenges of developing in-space Earth-orbiting instruments. Because of restricted payload masses for these ambitious missions, planetary in situ instruments must be very small (a few kg, at most), consume low power (20W or less), take up low volume (a few liters, at most), and be highly automated from instrument turn-on to data transmission. To address this need, a compact improvement on time-resolved streak-tube and intensified photodiode (IPD) technology will be developed that is better at achieving the sensitivity, resolution, and count rates. The proposed hybrid intensified solid-state pixelated anode detector (ISPAD) senses and timestamps microchannel-plate (MCP) -multiplied electron clouds at picosecond time scales, allowing photon detection with subpixel spatial resolution, at rates ranging from a few counts per second to billions of counts per second. In Phase I, a solid-state multi-anode readout circuit, optimized for operation in an MCP image tube, will be designed and simulated. After updating the engineering requirements control document, a complete layout, extraction, and simulation of the pixel elements will be performed. A vacuum header will be designed, and the process of integrating the tube body with the photocathode will be established. A preliminary design review (PDR) with NASA technical monitors, instrument designers, scientists, and other stakeholders will then be conducted.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Voxtel, Inc.	Lead Organization	Industry	Beaverton, Oregon
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations

Alabama	Oregon
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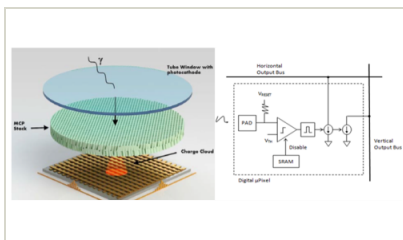
Project Transitions

**June 2015:** Project Start**December 2015:** Closed out

Closeout Documentation:

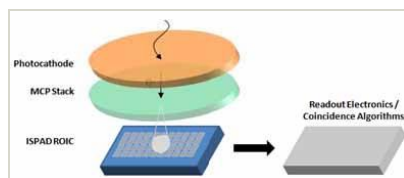
- Final Summary Chart(<https://techport.nasa.gov/file/138880>)

Images



Briefing Chart

Compact High-Resolution, Time-Resolved Intensified Image Sensor Briefing Chart
(<https://techport.nasa.gov/image/127941>)



Final Summary Chart Image

Compact High-Resolution, Time-Resolved Intensified Image Sensor, Phase I Project Image
(<https://techport.nasa.gov/image/130796>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Voxtel, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

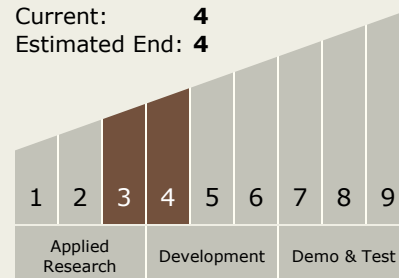
Carlos Torrez

Principal Investigator:

Adam Lee

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.4 Environment Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System